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⑫⑦ Applicant: Wood, Thomas John, 25, Chalfont Close,  
Bedworth, Near Nuneaton Warwickshire (GB)

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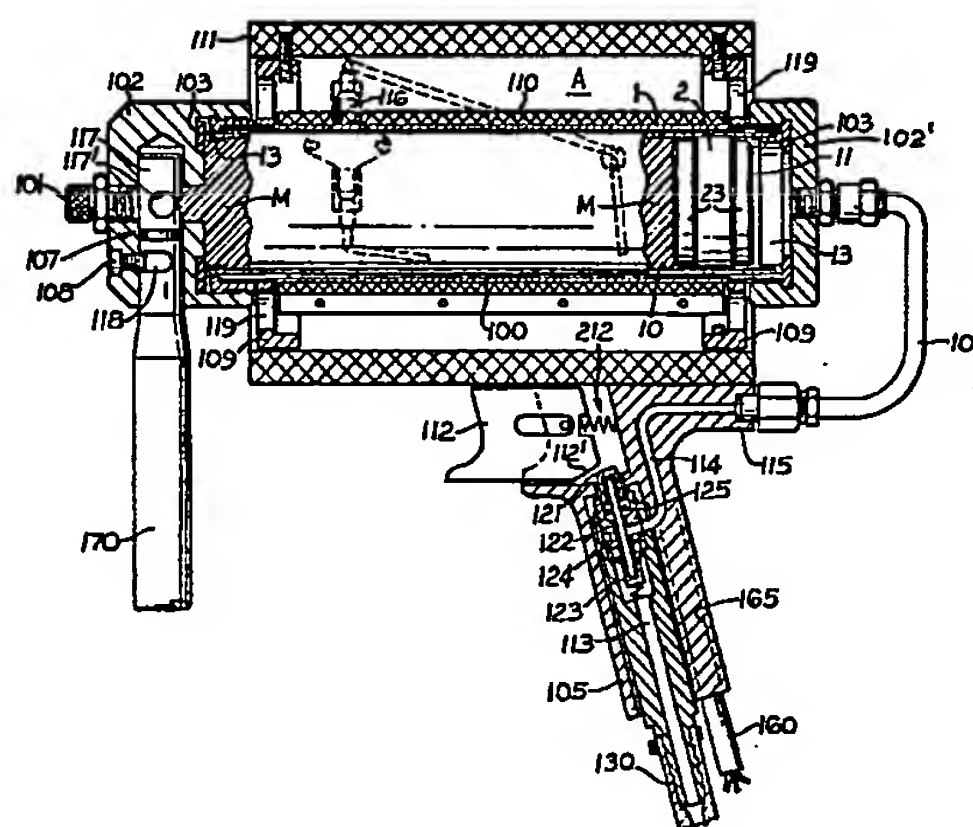
⑫⑧ Inventor: Wood, Thomas John, 25, Chalfont Close,  
Bedworth, Near Nuneaton Warwickshire (GB)

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⑫⑨ Representative: Fletcher Wilson, Thomas Arthur et al,  
10 Grosvenor House Grosvenor Road, Coventry West  
Midlands, CV1 3FZ (GB)

⑫⑤④ Cartridge for holding mastic or similar material in an applicator gun.

⑫⑤⑦ A cartridge for holding mastic or similar material in the barrel (100) of an applicator gun consists of an open ended hollow cylindrical member or sleeve (1) having a bore (10) therethrough which receives a piston (2) slidable in the bore in either direction. With the piston (2) at one end of the bore (10) a body of mastic material (M) is inserted in the bore at the other end for expulsion by the piston (2) therefrom when the mastic material (M) is heat softened in the gun. The arrangement is such that after full expulsion of the mastic material (M) the sleeve (1) can then be either used in a reverse position in the gun barrel (100) with a further body of mastic material (M) inserted in the sleeve (1) for expulsion by repeat operation of the piston (2), or the piston (2) can be returned along the bore (10) for similar operation. The piston (2) is preferably retained against movement out of the sleeve (1) such as by retaining rings (13) at each end of the latter.



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The object of this invention is to provide a re-usable cartridge for holding mastic or similar material, such as butyl mastic sealant or a hot melt adhesive in the barrel of an applicator gun as used for application of the material for various purposes, e.g. as a sealant to double glazing window units. Practical advantages of the invention as regards the resulting mode of use of the cartridge or several thereof with an applicator gun will be apparent from the following disclosure.

According to the invention a cartridge for holding mastic or similar material and for use in an applicator gun comprises an open ended hollow cylindrical member or sleeve for insertion in the barrel of an applicator gun and providing a bore receiving a piston slidable therein in either direction whereby when the piston is at or near one end of said bore the other end of said bore can receive a body of mastic or similar material inserted therein for expulsion when heat softened from the bore at said other end thereof by applicator gun operation of the piston, the arrangement being such that, after full expulsion of the material, the hollow cylindrical member can then be either used in a reversed position in the gun barrel with a further body of mastic or similar material inserted in the bore of said member for expulsion by repeat operation of the piston, or the piston can be returned for similar further operation.

A practical example of the cartridge and gun is shown in the accompanying drawings in which:-

- FIGURE 1 is an axial plane section of the cartridge per se
- FIGURE 2 is an axial plane section of an applicator gun containing the cartridge, and
- FIGURE 3 is a rear end view of the gun.

The open ended hollow cylindrical member or sleeve 1 is of suitable heat resistant material such as stainless steel which also enables the sleeve 1 to have a smooth interior bore 10 of constant diameter.

The sleeve receives slidably therein a piston 2 having a fluid-tight working fit in the bore 10 and is also of heat resistant material to withstand working conditions of the cartridge in an applicator gun, e.g. at temperatures of the order of 200°C. At the same time it should have an easy sliding fit in the bore 10 and must be of adequate strength.

A suitable anti-friction material from which the piston can be made is glass fibre reinforced polytetrafluoroethylene (PTFE).

Dependent on the nature of the mastic material the piston 2 may have a plain periphery as shown or it may be annularly grooved to accommodate one or more sealing rings of heat resistant material such as silicone rubber.

The open ends 11,12 of the sleeve 1 receive retaining rings 13 to retain the piston 2 within the bore 10 and also provide fluid-tight seating against end sealing rings 103 in the barrel 100 of an applicator gun. The rings 13 are of sufficient inward radial extent to retain the piston 2 against movement out of the bore 10 yet offer little or no resistance to expulsion of mastic material from the bore 10. End portions of the piston 2 are shown of reduced diameter at 23 to accommodate either ring 13 when the piston reaches an extreme end position in the sleeve 1. This ensures substantially full expulsion of the mastic material from the bore 10 of the sleeve 1 so that the latter is left in a clean condition ready to receive a further body of the material.

With the piston 2 at or near one end 11 of the sleeve 1 a cylindrical body of mastic or similar material of appropriate length is inserted into the sleeve through the other end 12. Particularly in the case of butyl mastic material it is of hard solid form at room temperature and can be readily produced by extrusion to a diameter for a close fit in the sleeve 1 and can be cut to required length as it is extruded.

The loaded cartridge or sleeve 1 is then inserted in the barrel 100 of an applicator gun for operation of the piston 2 by air under pressure from the pipe 104 to expel the heat softened mastic material/<sup>M</sup>from the open end 12 of the sleeve 1 and through the nozzle 101 of the gun. The sleeve containing mastic material can thus be front end loaded into the gun barrel 100 by removal of the end cap 102 carrying the nozzle 101.

The mastic material is softened by the heating coil or coils 110 of the gun about the barrel 100 and preferably the loaded cartridge 1 is pre-heated in an oven prior to insertion in the gun barrel 100 so that the mastic material is already softened and only requires to be maintained in the softened condition with a minimum of further heating by the heating coil 110 before application can be commenced. Thus heating time in the gun and delay before use is kept to a minimum. Several cartridges may be used, e.g. in succession with a single gun in maintaining more or less continuous operation of the latter, i.e. with waiting loaded cartridges pre-heated in an oven and each empty cartridge reloaded with a cold body of mastic material and then placed in the oven.

Cartridges containing heat softened mastic material in the oven and prior to and on loading into the gun should be handled in an upright position with the piston 2 at the lower end of the sleeve 1 to retain the softened mastic material in the latter.

In order to reload the sleeve 1 it is simply removed from the barrel 100 by removal of the nozzle cap 102 and a further cylindrical body of mastic material inserted into the sleeve bore 10 through the open end 11 up to the piston 2 now at or near the open end 12 of the sleeve 1. After any pre-heating the reloaded sleeve is replaced in the gun barrel<sup>100</sup> with the end 11 now at the nozzle end of the barrel so that the piston 2 can be compressed air operated for return movement in expelling the softened mastic material from the sleeve 1 and gun nozzle 101.

Alternatively the piston 2 of an emptied sleeve 1 can be returned to its original position and the sleeve 1 reloaded from the same end. However the reversible use described above avoids the need to separately return the piston.

In addition to the fact that the cartridges can be used over and over again and in a systematic manner in conjunction with an applicator gun and pre-heating oven, the invention has the important advantage that disposable cartridges hitherto used to supply mastic material ready for use in a gun are no longer necessary with considerable saving in the cost of supplying the material. Thus the cylindrical bodies or slugs of the cold and hard mastic material can be supplied and handled without individual packaging other than any paper or similar wrapping, e.g. in bulk supply containers.

Referring in more detail to FIGURES 2 and 3, the gun barrel 100 is shown located in relation to an outer casing or jacket 111 of heat insulating material by end rings 109 provided with holes 119 for cooling air flow in the annular space A between the casing and the heating coil 110 about the barrel 100. The heating coil 110 extends for a major part of the length of the barrel 100 to ensure effective heating of the mastic material M in the cartridge sleeve 1.

Secured by a cradle portion 115 to the casing 111 is a pistol grip 105 carrying a slidable trigger 112 for operation of a control valve 120 controlling the supply of air under pressure from a supply hose 130 and via a passageway 113 in the pistol grip 105 to a further passageway 114 and the pipe 104 to the rear of the gun barrel 100 through the end cap 102'.

When the trigger 112 is pulled back against its spring loading 212 a rear inclined heel portion 112<sup>\*</sup> of the trigger depresses a plunger 121 of the control valve 120 which by a pin 122 lifts a spring loaded valve member 123 to permit compressed air flow from the passageway 113 to the further passageway 114 via the interior of the valve body 124. When the plunger 121 is depressed in this way it presses a sealing ring 125 into sealing engagement against the valve body 124 and about the pin 122 but on release of the trigger 112 the sealing ring 125 is able to lift to permit venting of excess air under pressure past the upper end of the pin 122 and plunger 121.



Issue of mastic material M from the nozzle 101 is obtained as required by operation of the trigger 112 with further control in this respect shown afforded by a tap or cock 107 provided in the nozzle cap 102, the valve member 117 of which has a transverse bore 117' and is rotated by a radial handle 170 to the cap 102. The handle 170 is secured to the valve member 117 as an extension of the latter. Twisting of the handle 170 turns the valve member 117 to open or close the valve 107 to the required extent, such turning movement being shown limited by a screw 108 engaging a part annular groove 118 in the valve member 117 and which also serves to retain the latter in position. Thus the rate of issue of the mastic material from the nozzle 101 can be readily controlled by turning the handle 170 and can be immediately stopped e.g. at the end of an application run. The handle 170 also serves for holding the gun in use, i.e. in conjunction with the pistol grip 105 and further provides a handle for unscrewing the nozzle cap 102 from the gun barrel 100 when cartridge removal and replacement is required.

The pistol grip 105 also includes a bore 165 for receiving flexible cable 160 for the supply of electric current to the heater coil 110 via a control switch 106 and thermostat 116 which latter controls the operating temperature of the coil 110.



CLAIMS

1. A cartridge for holding mastic or similar material (M) and for use in an applicator gun comprising an open ended (11,12) hollow cylindrical member or sleeve (1) for insertion in the barrel (100) of an applicator gun and providing a bore (10) receiving a piston (2) slidable therein in either direction whereby when the piston (2) is at or near one end of the bore (10) the other end of said bore (10) can receive a body of mastic or similar material (M) inserted therein for expulsion when heat softened from the bore (10) at said other end thereof by applicator gun operation of the piston (2), the arrangement being such that, after full expulsion of the material (M), the hollow cylindrical member (1) can then be either used in a reversed position in the gun barrel (100) with a further body of mastic or similar material inserted in the bore (10) of said member (1) for expulsion by repeat operation of the piston (2), or the piston (2) can be returned for similar further operation.
2. A cartridge for holding mastic or similar material (M) and according to claim 1 wherein the open ends (11,12) of the hollow cylindrical member (1) are provided with retaining means (13) of sufficient inward radial extent to prevent movement of the piston (2) out of the hollow cylindrical member (1) yet offer little or no resistance to the expulsion of mastic or similar material therefrom.

3. A cartridge for holding mastic or similar material (M) and according to claim 2 wherein the open ends (11,12) of the hollow cylindrical member (1) are each provided with a retaining ring (13) of said sufficient inward radial extent.
4. A cartridge for holding mastic or similar material (M) and according to claim 3 wherein end portions (23) of the piston (2) are of reduced diameter to accommodate the radial inward extent of a retaining ring (13) when the piston (2) is at an extreme end position in the hollow cylindrical member (1).
5. A cartridge for holding mastic or similar material (M) and according to any of the preceding claims wherein the hollow cylindrical member (1) is of a heat resistant material such as stainless steel to provide a smooth or polished bore (10) therein.
6. A cartridge for holding mastic or similar material (M) and according to any of the preceding claims wherein the piston (2) is of heat resistant anti-friction material such as glass reinforced polytetrafluoroethylene (PTFE).

7. An applicator gun for applying mastic or similar material (M) comprising a barrel (100) provided with a removable nozzle (101,102) at the forward end of the barrel (100); a removable cartridge (1) inserted in said barrel (100) from the forward end thereof, said cartridge consisting of an open ended (11,12) hollow cylindrical member or sleeve (1) having a bore (10) containing a piston (2) slidable therein in either direction and for receiving a body of mastic material (M) inserted therein when the piston (2) is at or near one end of the hollow cylindrical member or sleeve (1); heating means such as one or more electric heaters (110) provided about the barrel (100) for heating the latter in order to soften or maintain softened mastic or similar material in the cartridge (1); a body such as a handle (105) carrying the barrel (100) and provided with operable means (112,120) for applying pressure to said piston (2) whereby softened mastic or similar material (M) can be expelled from the hollow cylindrical member or sleeve (1) and ejected through the nozzle (101), the hollow cylindrical member (1) being capable of being subsequently used in either a reversed position in the gun barrel (100) with a further body of mastic or similar material (M) inserted therein for expulsion by repeat operation of the piston (2), or the piston (2) can be returned for similar further operation.

8. An applicator gun according to claim 7 wherein the ends of the hollow cylindrical member (1) seat against sealing means (103) provided in the gun adjacent each end of the gun barrel (100).
9. An applicator gun according to claim 7 or 8 wherein there is provided between the nozzle (101) and adjacent end of the gun barrel (100) and hollow cylindrical member (1) a tap or cock (107) for controlling issue of mastic or similar material from the nozzle (101).
10. An applicator gun according to claim 9 wherein a handle (170) for operating the tap or cock (107) extends from an end cap (102) to the gun barrel (100) and carrying the nozzle (101) in order to also provide a handle for use in holding or steadying the gun and for operating the end cap (102) for removal from the barrel (100) or replacement thereon.

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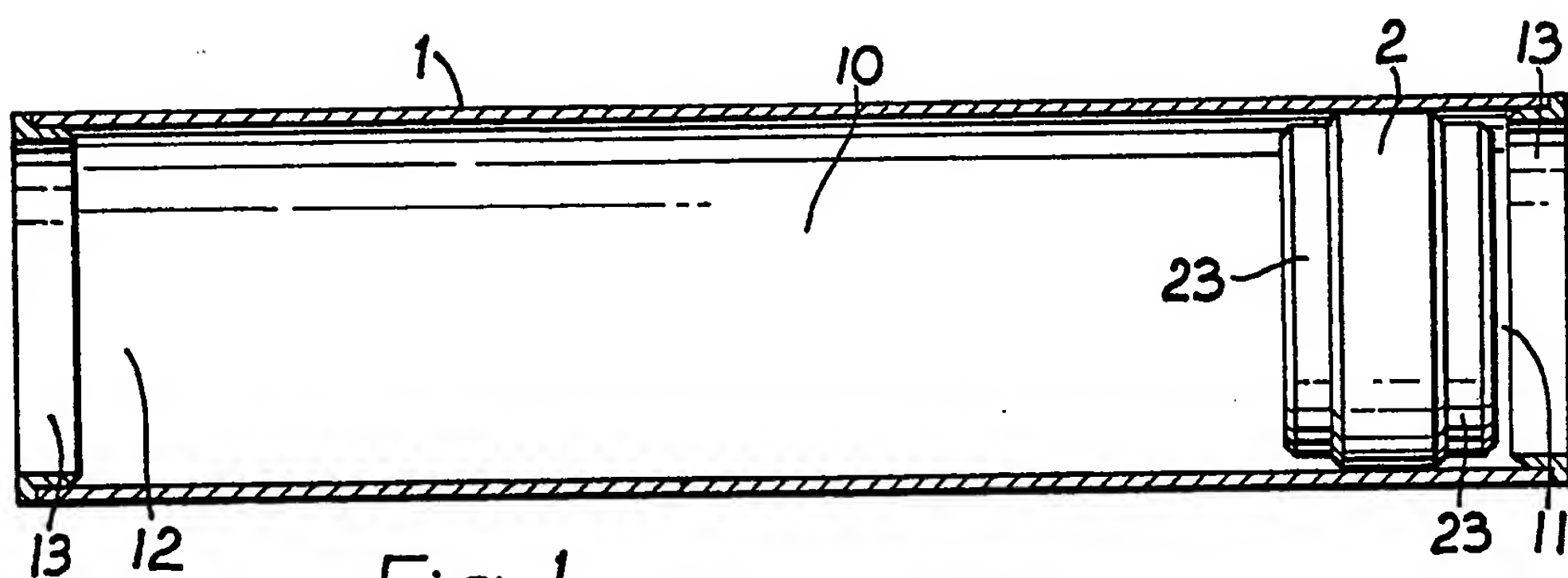


Fig. 1

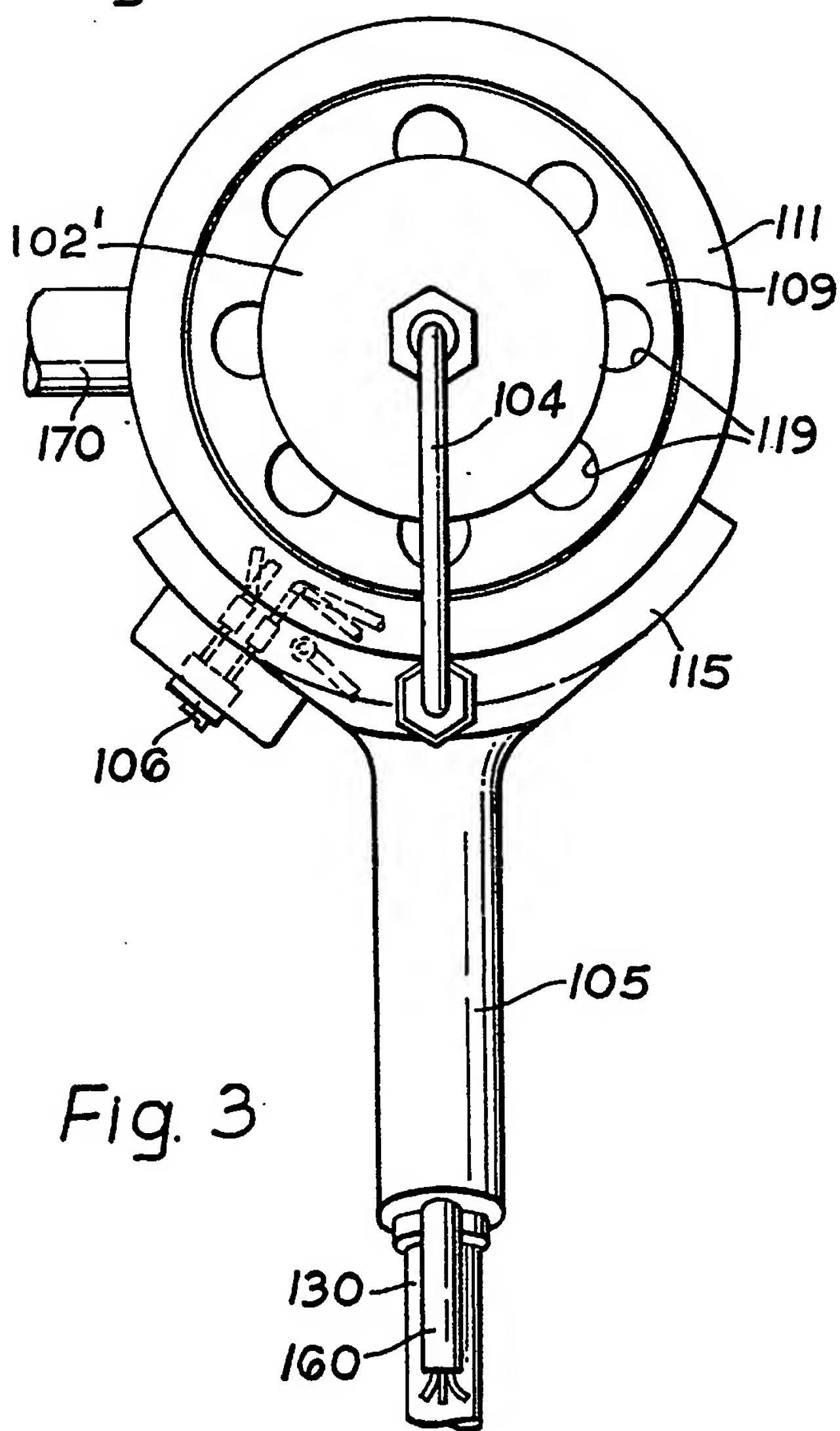


Fig. 3

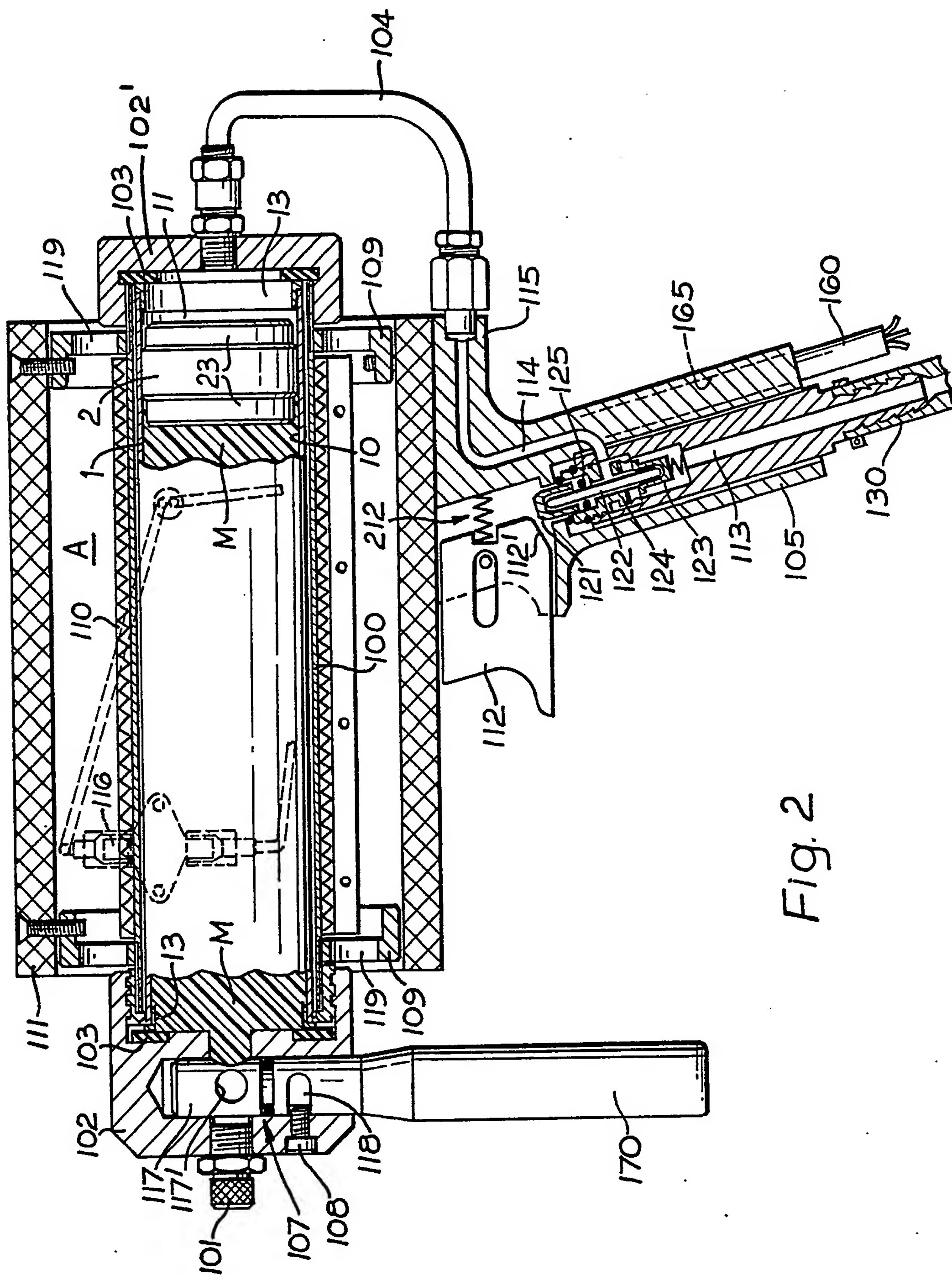


Fig. 2